

Initially, Applicant notes that the publication date of the Nakayama reference is September 4, 2003. Further, Applicant's U.S. filing date is August 1, 2003. Thus, Nakayama clearly does not qualify as prior art for purposes of 35 U.S.C. § 102(b). Therefore, Applicant responds to the Nakayama rejection assuming the Examiner intended to apply Nakayama as a 102(e) reference.

The outstanding rejections are addressed as follows:

**Claim rejections - 35 U.S.C. § 102(e) based on Hasebe et al.**

Claims 9-10, 18 and 20-24 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by US Patent No. 6,744,135 to Hasebe et al. (hereinafter "Hasebe"). Applicant respectfully traverses and submits that the rejection is improper because Hasebe fails to anticipate the elements of claims 9 and 24.

In rejecting claims 9 and 24, the Examiner points specifically to figures 1(g) and 4 and relies on the heat radiating electrode 117 of Hasebe as the claimed heat radiating mechanism, metal core substrate 105 and copper foil 104 as the claimed substrate including a conductive layer, and terminal 118 as the claimed terminals.

In response, Applicant notes that claims 9 and 24 require that "the terminals of the IC chip and the heat-radiating mechanism are electrically connected, and the heat-radiating mechanism and the conductive layer of the substrate are electrically connected." In contrast, Hasebe states that the heat radiating electrode 117 is *insulated* from the external terminal 118. (Hasebe at col. 8, lines 6-10, describing the manufacturing method shown in figures 1(a)-1(g)). Thus, as clearly shown in figure 1(g) and the text of the reference, the heat radiating electrode

117 and the terminal 118, which the Examiner analogizes to the claimed heat-radiating mechanism and terminals, respectively, are not electrically connected, as required by claims 9 and 24. Moreover, the electrical connection between the heat radiating mechanism and the terminals is significant because it provides for the heatsinks to be used as respective connection terminals to power and ground terminals which results in a simpler connection structure and less expensive packaging labor. (Specification at page 10).

Further, Applicant notes that figure 4 merely describes two heat radiating via hole portions 401 and 402 formed in the structure of an electronic substrate. (Hasebe at col. 11, line 55 - col. 12, line 20). The heat radiating via holes allow the formation of heat radiating electrodes that provide for electrical connection to copper plating of the substrate. (see Hasebe at col. 10, line 41 - col. 11, line 39 and col. 11, lines 59-65). However, there is no teaching or suggestion for a heat radiating mechanism electrically connected to **both** a conductive layer and the terminals, as claimed. Indeed, the embodiment disclosed in figure 4 of Hasebe is simply disclosing two holes formed in a substrate that are used for heat radiating electrodes which connect to the substrate. As previously discussed in reference to the embodiment of figures 1(a)-1(g), there is no suggestion in the embodiment of figure 4 or elsewhere in Hasebe for any electrical connection of the heat radiating mechanism to the terminals of the IC chip.

Therefore, Applicant submits that the rejection of claims 9 and 24 is improper because Hasebe fails to anticipate the elements of the claims. Accordingly, Applicant requests the withdrawal of the rejection. Further, Applicant submits claims 10, 18, and 23 are allowable at

least by virtue of their dependency from claim 9, and requests the withdrawal of these rejections as well.

**Claim rejections - 35 U.S.C. § 102(b) based on Nakayama**

As stated above, Nakayama does not qualify as prior art under 35 U.S.C. § 102(b). However, Applicant addresses the rejection as if it were made under 35 U.S.C. § 102(e). Accordingly, Applicant traverses the rejection of claims 9, 10 and 18-24 based on Nakayama (US Patent Publication No. 2003/0164549 A1).

Initially, Applicant notes that the Examiner points to figure 15 of Nakayama and relies on element 308 as the claimed heat-radiating mechanism and element 04 to provide the electrical connection between the heat radiating mechanism and the conductive layer of the substrate. However, there is no element 308 or 04 in figure 15 of Nakayama. Further, elements 308 and 04 are not found in any of figures 1-25 of Nakayama or anywhere in the reference. Therefore, Applicant submits that the rejection of claims 9 and 24 is improper because all of the claim limitations have not been identified by the Examiner.

Furthermore, with respect to element 14 which the Examiner analogizes to the claimed plural heat sinks, Applicant notes that this element refers to the wiring pattern 14 of Nakayama. (see paragraph 71 at page 3). Additionally, the Examiner relies on element 14 as the claimed conductive layer. Claims 9 and 24 requires that the heat radiating mechanism comprises the plural heat sinks, and further requires that the heat radiating mechanism is electrically connected to the conductive layer. With respect, Applicant submits that the Examiner's interpretation of

Nakayama is improper. The Examiner provides no explanation as to how a wiring layer can simultaneously function as a conductive layer while also being plural heat sinks for a heat radiating mechanism which is electrically connected to the conductive layer.

There is absolutely no suggestion in Nakayama that the wiring pattern is a heat sink. Indeed, the only heat sinks described in Nakayama are *above* the IC chips, not disposed below the IC chip as required by claims 9 and 24. Moreover, although figure 15 may disclose plural heat sinks 112, the heat sinks are clearly not electrically connected to either a conductive layer of the substrate or to terminals of the IC chip. Indeed, the heat sinks 112 are attached above the IC chip 20 and substrate 11 by a sealant 51. (Nakayama at paragraph 93 on page 5). However, the sealant 51 is clearly not providing any electrical connection with the heat sink because it would necessarily electrically connect each of the plurality of electrodes 22 of the IC chip as well, which would prevent the IC from functioning. Thus, the only heat sinks taught or suggested by Nakayama are merely suspended above semiconductor devices without any teaching or suggestion of the electrical connection required by claims 9 and 24. (see Nakayama at paragraphs 22-23 on pages 1-2).

In contrast, claims 9 and 24 require that “the terminals of the IC chip and the heat-radiating mechanism are electrically connected, and the heat-radiating mechanism and the conductive layer of the substrate are electrically connected.” Thus, the rejection of claims 9 and 24 is improper because Nakayama fails to teach or suggest the claim limitations. Accordingly, Applicant requests the withdrawal of these rejections. Additionally, Applicant submits that

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claims 10 and 18-23 are allowable at least by virtue of their dependency from claim 9 and requests the withdrawal of these rejections as well.

Furthermore, with respect to claim 10, the Examiner relies on elements 308, 316 and 322 as the claimed plural heat sinks. However, no such element numbers are found in the Nakayama reference.

### **Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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